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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/768,246	01/25/2001	Kazushi Higashi	2001_0055	3700

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EXAMINER	
PAREKH, NITIN	
ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 10/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/768,246	Applicant(s) HIGASHI ET AL.	
	Examiner Nitin Parekh	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *08 July 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *1-3,6,10 and 13-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4,5,7-9,11 and 12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3 and 4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Election/Restrictions

1. Election of claims 4-12 directed to the Embodiment 3 is acknowledged.

However, claims 6 and 10 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Claims 6 and 10 are directed to Embodiment 6 (Fig. 7-10; see paper # 8 and 5). Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits.

Accordingly, claims 6 and 10 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Double Patenting

2. NON-STATUTORY

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claim 4 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 6207549.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claim 4 is generic to the claims 1 and 2 of U.S. Patent No. 6207549, the generic features/elements comprising a semiconductor arrangement in which a bump electrode is bonded to a circuit forming surface of an integrated circuit (IC)/chip by a method, the method comprising operating a bonding capillary at a ball bond forming position to form a ball bond portion on the IC electrode, moving the capillary upward, sideways and downward with respect the IC electrode, bonding a wire to the ball bond portion, cutting the wire, the wire being prevented from coming in contact with portions around the ball bond other than the ball bond portion; wherein the bump electrode comprising a first protrusion portion formed by once melting and solidifying a wire and its periphery, being bonded to the IC electrode and

further having a wire material portion in the vicinity of the melted portion being bonded and extended downwardly from the vertex portion, a second formed of an unmelted portion of the wire and being extended from the first protrusion, the bump electrode having the first and second protrusions being contacted or put close with the respective electrode when the IC chip is conventionally mounted on a circuit board .

The generic claims are generally considered obvious over more specific claims.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 7, line 2 cites: "...said formed portion has a base portion bonded to said electrode..."

However, the description in specification and Figures (14B, 16, etc.) show the base portion of the bump electrode being bonded to the IC electrode and not to the said electrode on the circuit board.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 4, 5, 7-9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art (APA) in view of Yasuzato et al (US Pat. 5060843), Khandros (US Pat. 5476211) and Khandros et al (US Pat. 5917707).

Regarding claim 4, the APA discloses a semiconductor arrangement in which a bump electrode is bonded to a circuit forming surface of an integrated circuit (IC)/chip by a method comprising:

- operating a bonding capillary at a ball bond forming position to form a ball bond portion on the IC electrode (106a and 104 respectively in Fig. 17A-C; Fig. 20A; Specification pages 1 and 2)
- moving the capillary upward with respect the IC electrode
- moving the capillary sideways and down ward with respect the IC electrode

- bonding a wire to the ball bond portion, and
- cutting the wire, the wire being prevented from coming in contact with portions around the ball bond other than the ball bond portion itself by adjusting/presetting the descent position

(Fig. 17A-C; Fig. 20A; Specification pages 1 and 2),

wherein the bump electrode comprises:

- a first protrusion portion comprising a formed portion having a vertex/tip, (cone shaped bump portion in 106a), the formed portion formed by once melting and solidifying a wire and its periphery and is bonded to the IC electrode and further having a wire material portion (not numerically referenced in Fig. 20A-see the bonded wire portion connecting the second protrusion) in the vicinity of the melted portion being bonded and extended downwardly from the vertex portion
- a second protrusion (not numerically referenced in Fig. 20A- tail portion of the wire having a tip) formed of an unmelted portion of the wire and being extended from the first protrusion, and
- the bump electrode having the first and second protrusions are being contacted or put close with the respective electrode when the IC chip is conventionally mounted on a circuit board (Fig. 19A-C)

(Fig. 17A-20C; specification pages 1-3).

The APA fails to specify the second protrusion being extended from the first protrusion beyond a planar area defined by projecting the first protrusion to a height approximately equal to that of the first protrusion with respect the IC electrode.

Khandros teaches using bump electrodes having a plurality of protrusions which extend beyond (33, 35, 63, etc. in Fig. 14-16; Col. 12 and 13) a planar area defined by projecting the first protrusion to a height approximately equal to that of the first protrusion with respect the IC electrode to achieve the flexibility for an interconnection.

Yasuzato et al teach using a bump electrode having a protrusion which extends beyond (23cc in Fig. 5A) a planar area defined by projecting the first protrusion to a height approximately equal to that of the first protrusion with respect the IC electrode.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the second protrusion being extended from the first protrusion beyond a planar area defined by projecting the first protrusion to a height approximately equal to that of the first protrusion with respect the IC electrode so that the flexibility and capability for the interconnections can be improved using Khandros and Yasuzato et al's wiring structures in the APA.

Regarding claim 5, the claim elements have been addressed in the rejection as explained above for claim 4.

Regarding claims 8 and 9, the APA further discloses the second protrusion (not numerically referenced in Fig. 20A- tail portion of the wire having a tip) being extended toward an outer end surface side of the semiconductor element without exceeding the outer end surface but fails to specify the same extending outwardly beyond the outer end surface of the semiconductor element.

Khandros et al teach using a variety of configurations where the bump protrusions extend outwardly beyond the outer end surface of the semiconductor element (Fig. 11, 12, etc.; Col. 9).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the second protrusion being extended outwardly beyond the outer end surface of the semiconductor element so that the flexibility and capability for the interconnections can be improved using Khandros et al, Khandros and Yasuzato et al's wiring structures in the APA.

Regarding claim 11, the APA further discloses the ball bond portion and the wire having no circumscribed space (Fig. 20A).

Regarding claim 12, the claim elements have been addressed in the rejection as explained above for claim 4.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 703-305-3410. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

Nitin Parekh

NP

09-25-02

Tom Thomas

TOM THOMAS
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